Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-29 (cancelled)

~~Claim 30 (new)~~ ~~A node control device for a node device in an optical network~~ system, the node device functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the node control device comprising:

an edge/core determination means for determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

a cut-through request packet processing means for notifying open resource information of the self node device to an upstream side of a transfer route as a cut-through request packet when the self node device corresponds to said destination side edge node, and for adding the open resource information of the self node device to the cut-through request packet received from a downstream side of the transfer route and transferring it to the upstream side of the ~~transfer route~~

when the self node device corresponds to said core node;

an optical path allocation request packet processing means for determining the optimum allocation of an optical path based on the open resource information of said cut-through request packet received from the downstream side of the transfer route and notifying said allocation to a node device which functions as said core node, to be a target of said optical path allocation, using an optical path allocation request packet when the self node device corresponds to said transmission side edge node; and

an optical path switching means for controlling an optical switch according to the allocation notified using said optical path allocation request packet, setting an optical path which cuts through a higher layer, and notifying the transmission side edge node using an optical path setting completion notice packet when the self node device corresponds to the node device which functions as said core node.

Claim 31 (new) A node control device for a node device in an optical network system, the node device functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network

~~system to outside said optical network system, the node control device comprising:~~

an edge/core determination means for determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

a cut-through request packet processing means for notifying open resource information of the self node device to a downstream side of a transfer route as a cut-through request packet when the self node device corresponds to said transmission side edge node, and for adding the open resource information of the self node device to the cut-through request packet received from an upstream side of the transfer route and transferring it to the downstream side of the transfer route when the self node device corresponds to said core node;

an optical path allocation request packet processing means for determining the optimum allocation of an optical path based on the open resource information of said cut-through request packet received from the upstream side of the transfer route and notifying said allocation to a node device which functions as said core node, to be a target of said optical path allocation, using an optical path allocation request packet when the self node device corresponds to said destination side edge node; and

an optical path switching means for controlling an optical switch according to the allocation notified using said optical path allocation request packet, setting an optical path which cuts through a higher layer, and notifying the transmission side edge node using an optical path setting completion notice packet when the self node device corresponds to the node device which

functions as said core node.

Claim 32 (new) A node control device for a node device in an optical network system, the node device functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the node control device comprising:

an edge/core determination means for determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

a cut-through setting packet processing means for notifying open resource information of the self node device to an upstream side of a transfer route as a cut-through setting packet when the self node device corresponds to said destination side edge node, determining the possibility of setting an optical path for cutting through a higher layer using the open resource information presented to the cut-through setting packet received from a downstream side of the transfer route when the self node device corresponds to said core node, one of adding said information to the cut-through setting packet, and adding the open resource information of the self node to said

~~received cut-through~~ request packet, and ~~transferring the cut-through request packet to the~~ upstream side of the transfer route; and

an optical path switching means for controlling an optical switch and setting said optical path to the resource upon a determination that said cut-through is possible.

Claim 33 (new) A node control device for a node device in an optical network system, the node device functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the node control device comprising:

an edge/core determination means for determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

cut-through setting packet processing means for notifying open resource information of the self node device to a downstream side of a transfer route of the downstream side as a cut-through setting packet when the self node device corresponds to said transmission side edge node, ~~determining the possibility setting an optical path for cutting through a higher layer using~~

the open resource presented to the cut-through setting packet received from an upstream side of the transfer route when the self node device corresponds to said core node, on of adding said information to the cut-through setting packet, and adding the open resource information of the self node to said received cut-through request packet, and transferring the cut-through request packet to the downstream side of the transfer route; and

optical path switching means for controlling an optical switch and setting said optical path to the resource upon a determination that said cut-through is possible.

Claim 34 (new) The node control device according to Claim 30, further comprising:

a forced releasing means for forcibly releasing the optical path when a predetermined time has elapsed since setting of the optical path, or when a decrease in a number of communication packets is confirmed at the node device positioned at both ends of said optical path.

Claim 35 (new) The node control device according to Claim 30, further comprising:

a cut-through optical path determination means for determining the necessity of cut through before transmitting the cut-through request packet or transmitting the cut-through setting packet, and selectively setting the cut through optical path only when determined as necessary.

Claim 36 (new) The node ~~control device according to Claim 1, further comprising,~~ an information channel insuring means for determining whether an information channel is continuously insured after setting the cut-through optical path between the node devices on the route where the cut-through optical path is set before transmitting the cut-through request packet or transmitting the cut-through setting packet, and setting the cut-through optical path only when the information channel is insured.

Claim 37 (new) A node device comprising:

a router for receiving a transfer packet based on header information and determining the output destination of the transfer packet;

an optical cross-connect having inputs one for one of extracting (dropping) optical signals from an optical fiber or inserting (adding) optical signals to an optical fiber, and relaying optical signals between arbitrary input/output optical fibers for optical path setting; and

a node control device according to Claim 1 for switching a connected pair of each input port and output port inside said optical cross-connect according to instructions of the received transfer packet or based on self judgment.

Claim 38 (new) The node device according to Claim 37, further comprising:

a switch for ~~connecting a destination-based buffer to at least one of the outputs from said~~

~~router to said optical cross-connect, and connecting a packet read from said destination-based~~ buffer to an input port of said optical cross-connect.

Claim 39 (new) The node device according to Claim 38, further comprising:

an allowable delay recognition function means provided in said router for determining an allowable delay of a transfer packet, so that only packets having a large allowable delay are allowed to be output to said destination-based buffer and packets having a small allowable delay are directly output to said optical cross-connect.

Claim 40 (new) A node device comprising:

a router for receiving a transfer packet based on header information and determining the output destination of a transfer packet;

an optical cross-connect for one of extracting (dropping) optical signals from an optical fiber, or inserting (adding) optical signals into an optical fiber, and relaying optical signals between input/output optical fibers for optical path setting;

a node control device according to Claim 1 for switching a connected pair of each input port and output port inside said optical cross-connect according to instructions of the received transfer packet or based on self judgment; and

an optical path extraction/insertion (drop/add) means for an information channel for extracting ~~(dropping) optical signals with a fixed wavelength~~ insured for the information

~~channel from the optical fiber, or for inserting~~ (adding) said optical signals with a ~~fixed~~ wavelength into the optical fiber, for communicating information signals with another node device.

Claim 41 (new) A node device comprising:

a router for receiving a transfer packet based on header information and determining the output destination of a transfer packet;

an optical cross-connect for one of extracting (dropping) optical signals from an optical fiber, or inserting (adding) optical signals into an optical fiber, and relaying optical signals between input/output optical fibers for optical path setting;

a node control device according to Claims 1 for switching a connected pair of each input port and output port inside the optical cross-connect according to instructions of the received transfer packet or based on self judgment; and

a pilot tone signal transmission means for an information channel for overlaying pilot tone signals for the information channel on an optical path for user data or separating pilot tone signals for the information channel from the optical path for user data for communicating of information signals with another node device.

Claim 42 (new) The node device according to Claim 41, wherein said pilot tone signals for the information channel ~~are transmitted by a time division multiplex~~ system.

Claim 43 (new) An optical network system comprising a plurality of the node devices according to Claim 8.

Claim 44 (new) An optical path setting method for an optical network system having a plurality of node devices, each one of said node devices functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the method comprising the steps of:

the node device, which functions as said destination side edge node, notifying open resource information of a self node to an upstream side of a transfer route of said transfer packet as a cut-through request packet;

the node device, which functions as said core node, receiving said cut-through request packet from a downstream side of the transfer route, adding the open resource information of the self node to said received cut-through request packet and transferring the open resource information to said upstream side of the transfer route;

the node device, which functions as said transmission side edge node, determining the optimum allocation of an optical path based on said cut-through request packet received from the downstream side of said transfer route and notifying the determined allocation to the node device which functions as said core node, to be a target of said optical path allocation, as an optical path allocation request packet; and

the node device, which functions as said core node, setting an optical path which cuts through a higher layer according to said optical path allocation request packet and notifying the completion of said setting to the node device, which functions as said transmission side edge node, as said optical path setting completion packet.

Claim 45 (new) An optical path setting method for an optical network system having a plurality of node devices, each one of said node devices functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the method comprising the steps of:

the node device, which functions as said transmission side edge node, notifying open

resource information of a self node to a downstream side of a transfer route of said transfer packet as a cut-through request packet;

the node device, which functions as said core node, receiving said cut-through request packet from an upstream side of the transfer route, adding the open resource information of the self node to said received cut-through request packet and transferring the open resource information to said downstream side of the transfer route;

the node device, which functions as said destination side edge node, determining the optimum allocation of an optical path based on said cut-through request packet received from the upstream side of said transfer route and notifying the determined allocation to the node device which functions as said core node, to be a target of said optical path allocation, as an optical path allocation request packet; and

the node device, which functions as said core node, setting an optical path which cuts through the higher layer according to said optical path allocation request packet and notifying the completion of said setting to the node device, which functions as said transmission side edge node, as said optical path setting completion packet.

Claim 46 (new) An optical path setting method for an optical network system having a node device functioning as one of a transmission side edge node for inputting a transfer packet from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from

~~said node device in said optical network system and transferring the transfer packet which was~~ input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the method comprising:

determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

notifying open resource information of the self node to an upstream side of a transfer route as a cut-through setting packet when the self node device corresponds to said destination side edge node, determining the possibility of setting an optical path which cuts through a higher layer using the open resource information presented to the cut-through setting packet received from a downstream side of the transfer route when the self node device corresponds to said core node, one of adding said information to the cut-through setting packet, and adding the open resource information of the self node to said received cut-through request packet, and transferring to the open resource information to the upstream side of the transfer route; and

controlling an optical switch and setting said optical path to a resource for which it is determined that said cut-through is possible.

Claim 47 (new) An optical path setting method for an optical network system having a node device ~~functioning as one of~~ a transmission side edge node for ~~inputting a transfer~~ packet

from outside said optical network system and transferring the transfer packet to another node device in said optical network system, a core node for inputting said transfer packet from said node device in said optical network system and transferring the transfer packet which was input to another node device in said optical network system, and a destination side edge node for transferring the transfer packet which is input from said node device in said optical network system to outside said optical network system, the method comprising:

determining, with respect to said transfer packet, whether a self node device corresponds to said transmission side edge node, or corresponds to said core node, or corresponds to said destination side edge node based on the transfer packet;

notifying open resource information of the self node to a downstream side of a transfer route as a cut-through setting packet when the self node device corresponds to said transmission side edge node, determining the possibility of setting an optical path which cuts through the higher layer using the open resource presented to the cut-through setting packet received from an upstream side of the transfer route when the self node device corresponds to said core node, one of adding said information to the cut-through setting packet, and adding the open resource information of the self node to said received cut-through request packet and transferring the open resource information to the downstream side of the transfer route; and

controlling an optical switch and setting said optical path to the resource for which it is determined that said cut-through is possible.

Claim 48 (new) The optical path setting method according to Claim 44, wherein the optical path is forcibly released when a predetermined time has elapsed since the setting of the optical path, or when a decrease in a number of communication packets is confirmed at a node device positioned at both ends of the optical path.

Claim 49 (new) The optical path setting method according to Claim 44, further comprising:

determining the necessity of cut through before setting the cut-through optical path; and containing the setting processing continued only when the necessity is determined.

Claim 50 (new) The optical path setting method according to Claim 44, further comprising:

determining whether an information channel is continuously insured after setting the cut-through optical path between node devices on the route where the cut-through optical path is set before setting the cut-through optical path; and

setting the cut-through optical path only when the information channel is insured.

Claim 51 (new) The optical path setting method according to Claim 44, further comprising:

transmitting wherein a packet read from a destination-based buffer to the cut-

through optical path after setting.

Claim 52 (new) The optical path setting method according to Claim 51, only packets with a large allowable delay are stored in said destination-based buffer.

Claim 53 (new) The optical path setting method according to Claim 44, further comprising:

communicating information between node devices where the cut-through optical path is set by using optical signals with a fixed wavelength insured for the information channel after the cut-through optical path is set.

Claim 54 (new) The optical path setting method according Claim 44, further comprising:

overlapping a pilot tone signal for an information channel on the optical path for user data to communicate information between the node devices, where the cut-through optical path is set, after the cut-through optical path is set.

Claim 55 (new) The optical path setting method according to Claim 54, further comprising:

transmitting pilot tone signals for the information channel in the time division

multiplex system.